

III. SURFACE WATER ASSESSMENT

H. PUBLIC HEALTH/AQUATIC LIFE CONCERNS

1. Size of Waters Affected by Toxicants

As part of the CWA-mandated triennial water quality standards and criteria review, OWR finalized and adopted changes to the Water Quality Regulations in August 1997. The revisions to the Water Quality Regulations included adoption of updated aquatic life criteria, human health criteria, and dissolved criteria for metals. These criteria for the “priority pollutants” are consistent with the national criteria published by EPA pursuant to Section 304(a) of the CWA. RIDEM is currently finalizing a triennial review of the water quality standards and regulations which are proposing adoption of updated standards.

The surface water monitoring program, discussed in Chapter III.A, includes sampling for many of these toxic pollutants. However, not all waters assessed for this report are monitored or even evaluated for toxic impacts. In fact, sampling for toxics is focused on rivers and streams while limited for lakes/ponds and estuarine waters. Current toxics data is limited to 87 rivers, 18 lakes, and only several estuarine areas. This data gap in toxics monitoring will be addressed in the state’s Monitoring Strategy.

Table 3H-1 indicates the size of Rhode Island waters assessed for toxics and of those waters, the size with elevated levels of toxics. In most cases, metals are the toxic parameters of greatest concern, particularly lead. The waters assessed as impaired due to violations of metals criteria and summarized in Table 3H-1 below as waters with elevated levels of toxicants, have been included on the state’s 303(d) list of impaired waters. It is important to note that the old monitoring data for metals in several of these waters show violations of metal criteria, however, that data was expressed as total metals. In 1997, the state has adopted metals criteria expressed as dissolved metals. Therefore, in several waterbodies, it is not known whether these waters have “elevated levels of toxicants” based on dissolved metals criteria violations. The state has recently initiated sampling of this group of waterbodies to address this issue and is working to collect dissolved metals data in all monitoring projects.

Table 3H-1 Size of Waters Affected by Toxic Substances

Waterbody Type	Size Monitored for Toxicants	Size with Elevated Levels of Toxicants
Estuarine (sq. miles)	11.45	0
Lakes (acres)	1610.70	725.24
Rivers (miles)	304.60	137.02

2. Public Health/Aquatic Life Impacts

a. Fishing Advisories/Bans

All states in the northeast have issued fish advisories for mercury and other contaminants, warning residents, particularly children and pregnant women, to limit ingestion of certain fish species or fish caught in particular waterbodies. Unlike other northeast states, Rhode Island has not supported a routine surveillance program for fish tissue.

The OWR and USEPA, Region I have created a Workgroup focused on the issues of urban rivers. Participants include representatives from DEM, EPA, DOH, Department of Transportation, Narragansett Bay Commission, Coastal Resources Management Council, and various environmental advocacy groups. The issues of fish advisories and fish tissue monitoring programs for Rhode Island's urban rivers is being addressed by this workgroup. In the spring of 1997, RI initiated a small monitoring program to measure mercury levels in fish. This monitoring continued in 1999 and 2000. Only a small number of waterbodies and fish, however, have been tested for contaminants. These tests, along with more thorough testing across New England, show that fish can contain unsafe levels of mercury, dioxins and polychlorinated biphenyls (PCBs). Based on these test results, the RIDOH in April 2002 issued the following fish consumption advisories and advise on mercury in fish which are still in affect:

When Fishing In Saltwater

- Flounder, haddock and most other saltwater fish you can catch in the Bay and Ocean are low in mercury and safe to eat.
- Young children and women who are pregnant, nursing or planning to have a baby in the coming year, should not eat shark, swordfish, bluefish and striped bass.
- Clams, crabs and other shellfish are low in mercury.

When Fishing In Freshwater

- Young children and women who are pregnant, nursing or planning to have a baby in the coming year should not eat freshwater fish from Rhode Island ponds, lakes, or rivers. Choose trout from stocked waters or saltwater fish instead.
- Others can safely eat one meal of most freshwater fish per week if they know where to fish and what kinds of fish are safe to catch and eat.
- Avoid fish with the most mercury (bass, pike, pickerel).
- Fish for stocked trout.
- With the exception of trout, do not eat any fish from the lower Woonasquatucket River, Yawgoog, Wincheck, and Meadowbrook Ponds; and Quidnick Reservoir.
- Vary where you fish and what kind of fish you eat.
- Choose smaller fish to eat (according to the DEM's allowable size limit regulations).
- Limit eel and black crappie taken from all ponds, and all fish from Tucker, Yawgoo and Watchaug Ponds, to one meal per month.

b. Greenwich Bay Fish Kill - August 2003

On August 20, 2003 about one million fish, primarily juvenile menhaden, washed ashore along Greenwich Bay in Apponaug Cove and Greenwich Cove in Warwick. A massive slick of dead fish, extending from Cedar Tree Point to Buttonwoods, was also observed that afternoon. In addition to the juvenile menhaden, several hundred small crabs and some larger blue crabs, horseshoe crabs, grass shrimp, blackfish, and American eels were also observed along the shore or floating at the surface. The fish kill was followed a week later by a massive die-off of juvenile soft-shell clams. Discolored water and noxious odors also permeated the western shore of the bay.

In response, Governor Carcieri issued an urgent request for DEM to assess the causes and impact of the fish kill in Greenwich Bay. The Department submitted a detailed report to the Governor in September 2003 that reflected some important long-term challenges affecting the health of the Narragansett Bay, and recommendations that would prevent, or at least minimize, the recurrence of a similar event. The report can be found on DEM's website at www.state.ri.us/dem/pubs/fishkill.pdf.

A major finding of the DEM report was that the fish kill was not a simple or isolated event. It was part of a much larger event going on in Greenwich Bay and other parts of Narragansett Bay in 2003, and part of a trend that has been observed for many preceding years and will likely continue. Further, the findings indicated there is no magic solution, no quick fix. Future fish kills may not be entirely preventable, nor is there any guarantee that any action or combination of actions would reduce the risk of a recurrence significantly within a short period of time. The fish kill happened during a summer that also saw an extraordinary number of beach closings around Narragansett Bay, including locations that have not been usually affected in previous years. However, while some of the same factors have contributed to poor water quality at beaches and to the fish kill - an unusual amount of rain and storm water runoff - the phenomena are clearly different.

The fish kill was caused by the absence of dissolved oxygen (anoxia) in the waters of Greenwich Bay, particularly in its deeper waters and near its western shore. The condition caused fish and other marine animals living in these areas of the bay to suffocate. This conclusion was based on continuous measurements made by DEM in the western bay before the event was reported, and by surveys made throughout the bay on the day the kill was first reported. While the immediate cause for the kill was lack of oxygen, there is a broad and complex range of factors resulting in a severe and prolonged pattern of oxygen depletion. They include factors that cannot be controlled, at least not quickly or directly, such as rain, wind, temperature, geology and hydrodynamics. They also include pollution from various sources, including effluent from wastewater treatment facilities and septic systems, storm water runoff and groundwater flow from polluted areas, and possibly discharge from vessels using the Bay.

THE DEM report noted that although Rhode Island has had much success in improving water quality in Narragansett Bay, events like the Greenwich Bay fish kill demonstrate that the progress made to date is not good enough. The report made the following recommendations:

- Conduct a public workshop on the fish kill
- Consider new bond funding to revitalize assistance programs
- Accelerate nutrient upgrades at sewage treatment facilities

- Improve septic system management
- Improve storm water management
- Improve monitoring and assessment
- Improve Bay planning

Following the fish kill and an increased number of beach closures in 2003, the legislature as well as the Governor undertook several initiatives. Governor Carcieri organized the Narragansett Bay and Watershed Planning Commission. This Commission formed ten panels consisting of over 160 experts to review various issues and make recommendations for improved management of the Bay and its watershed. The Rhode Island Senate Joint Committees on Government Oversight and Environment and Agriculture conducted hearings on the management of Narragansett Bay and the House of Representatives established the Bay Trust Study Commission. These three initiatives produced reports which led to the passage of legislation in June 2004 intended to strengthen the management of Narragansett Bay and its watershed by formation of a Coordination Team and the RI Monitoring Collaborative. Additionally, Governor Carcieri directed state agencies to undertake or accelerate a number of actions to protect and restore the bay. Examples include formation of BART (Bay Assessment Response Team), installation of innovative stormwater BMPs at Scarborough Beach, and technical assistance on nutrient reduction, etc.

c. Shellfish Restrictions/Closures Currently in Effect

i. Shellfish Growing Area Monitoring Program

The Shellfish Growing Area Monitoring Program is part of the State of Rhode Island's agreement with the United States Food and Drug Administration's National Shellfish Sanitation Program (NSSP). The purpose of this program is to maintain national health standards by regulating the interstate shellfish industry. The NSSP is designed to oversee the management programs in shellfish producing states and to enforce and maintain an industry standard. As part of this agreement, the State of Rhode Island is required to conduct continuous bacteriological monitoring of the shellfish harboring waters of the state, in order to maintain certification of these waters for shellfish harvesting for direct human consumption. Rhode Island collects samples from 17 separate shellfish growing areas. These growing areas encompass all of Narragansett Bay and its shellfish harboring tributaries, all the south shore coastal salt ponds, Little Narragansett Bay, Block Island, and the Off Shore area. Each of the 17 growing areas incorporate anywhere from nine to 39 fixed sampling stations. Collecting bacteriological samples at all stations in one growing area on one day is considered one monitoring "run".

Water samples are collected monthly at the stations in the Upper Narragansett Bay. In 2001, fourteen sampling runs were made providing a total of approximately 126 samples. In 2002, the Upper Narragansett Bay water sampling plan was reconfigured to include the two remaining open stations in the Warren River, located at the mouth of the river. This changed the number of sampling stations in the Upper Narragansett Bay area from nine to eleven. In both 2002 and 2003 twelve sampling runs were made providing approximately

132 samples each year. The results are used to manage the conditionally approved shellfish growing area in the Upper Narragansett Bay.

Greenwich Bay, Mount Hope Bay and the Kickamuit River have been operating on a conditionally approved basis for the past several years. These areas are closed for a period of seven days following a wet weather event totaling 0.5" or greater. The areas are to be sampled monthly when they are open for shellfishing. Greenwich Bay is also an official management area overseen by the Division of Fish and Wildlife which restricts harvesting yield during the adverse winter season. The commercial harvesting of shellfish in Greenwich Bay is restricted to Mondays, Wednesdays and Fridays from 8AM to noon from mid-December through April. Pollution restrictions supersede management restrictions. The nineteen monitoring stations located in Greenwich Bay were sampled twelve times in both 2001 and 2002. These runs provided approximately 228 samples each year. In 2003, an additional station was added at the entrance to Buttonwoods Cove making a total of twenty monitoring stations in Greenwich Bay. In 2003, Greenwich Bay was sampled twelve times providing approximately 240 samples. The results are used to manage Greenwich Bay as a conditionally-approved shellfish growing area.

Mount Hope Bay and the Kickamuit River are also managed, on a conditionally-approved basis. The Kickamuit River was sampled 12 times per year in 2001, 2002, and 2003 at the 10 monitoring stations located in the growing area. This sampling provided approximately 120 samples per year. Mount Hope Bay was also sampled 12 times per year in 2001, 2002, and 2003 at the 16 monitoring stations located in this growing area. This sampling provided approximately 192 samples per year. Both growing areas are sampled at the same time, and the results are used to manage the Mount Hope Bay/Kickamuit River conditionally-approved shellfish growing areas. The closure rates for the conditionally managed areas; Upper Narragansett Bay, Greenwich Bay, Mt. Hope Bay, and Kickamuit River, are shown in Table 3H-3.

The other shellfish growing areas in Rhode Island are not subject to the volume and number of sewage discharges that effect the Upper Narragansett Bay, or the predictable nonpoint source impact that effects the Warren and Barrington Rivers, Greenwich Bay, Kickamuit River and Mt. Hope Bay. Accordingly, these other shellfish growing areas are monitored less frequently. In March 1981, the sampling program was expanded and has continued through the present. More recently, the emphasis has shifted to a trend-oriented monitoring program based on a random sampling methodology. At present, those growing areas that are approved for shellfish harvesting are sampled a minimum of six times a year. An attempt is made to sample growing areas a minimum of once a year where shellfish harvesting is prohibited. Due to the lack of potential pollution sources impacting the Off Shore growing area, it is classified as remote and therefore is required to be sampled only twice a year.

After collection, the water samples are returned to the RI Department of Health laboratory for analysis. The result of this analysis is a measure of the most probable number (MPN) of total and fecal coliform bacteria. Fecal coliforms are found in wastes from warm-blooded organisms. These bacteria are nonpathogenic (non-disease causing). Fecal coliforms do, however, serve as an indicator organism for the possible presence of other potentially pathogenic,

sewage-associated microorganisms which can cause such diseases as cholera, hepatitis, and gastroenteritis. These diseases may be contracted by consuming sewage-contaminated shellfish. The State retains its certification by restricting shellfish harvesting to those areas that maintain total and fecal coliform levels below certain statistical parameters established by the State and agreed to by the FDA. Rhode Island, with the consent of the FDA, recognizes the following six different classifications of shellfish growing areas:

Approved - This status allows unrestricted harvesting of shellfish (unless restricted by conservation closures) for direct human consumption and is only allowed in areas free from harmful levels of pollution.

Conditionally Approved/Seasonal - This status prohibits shellfishing only during the summer months (Memorial Day weekend through Columbus Day weekend) due to the potential pollution from concentrations of boats with marine toilets during the boating season, and also areas with elevated bacteriological levels due to suspected nonpoint septic system leachate from summer residences.

Conditionally Approved - These areas change in quality due to rainfall-related problems such as combined sewer overflow discharge and/or sewerage system failures. These areas are from time to time found to be in an unsatisfactory condition for the taking of shellfish for human consumption and are then declared to be polluted and closed. In most cases, closure for seven days occurs following a rain event of greater than 0.5" within a 24-hour period in the Providence area. Notice of conditional closures is advertised in a daily newspaper in Providence.

Prohibited - This status prohibits the harvesting of shellfish on a year-round basis due to the presence of pollution during significant periods of the year.

Conditionally Restricted - These areas are used for shellfish relays only.

Remote - These areas have no human habitation and are not impacted by any actual or potential pollution sources.

ii. Changes in Shellfish Growing Area Status : May 2002 through May 2004

DEM announces seasonal shellfish closures and any changes to shellfish closure status, annually in May. The seasonal closures are made every year during the summer months because of increased marine activity. In addition to seasonal closures, DEM announces classification changes made based upon the results of the Department's routine monitoring program. The changes made for the calendar years beginning May 2002 through May 2004 are detailed below and summarized in Table 3H-2.

In 2002, two additional areas of Greenwich Bay were closed to shellfishing because they exceeded the bacteria standard established by the NSSP. The closures included 201.8 acres in the northwest area of Greenwich Bay and

61.3 acres in Brushneck and Buttonwoods Coves. As a result of improved bacteria levels based on routine monitoring results, 19.22 acres in upper Point Judith Pond were opened to shellfishing. Elevated bacteria levels in the Champlin's Cove area of Point Judith Pond resulted in the closure of this 13.04 acre cove.

In 2003, an additional 235 acres of Greenwich Bay were permanently closed to shellfishing because the water quality in the area exceeded the bacteria standard established by the NSSP.

In 2004, 240 acres in the northwestern portion of Greenwich Bay were opened on a conditional basis as a result of improved water quality based on the Department's routine monitoring. This brought the closure line for the conditionally approved areas in Greenwich Bay back to the 2002 limit. An additional 2 acres in the Greenwich Cove area were closed due to exceedances of the bacteria standard. Forty-eight (48) acres in the Portsmouth/Melville area were opened to shellfishing to be consistent with water quality standards classification of the area. The new alignment opens a small amount of the shore off Dyer Island for shellfishing.

A summary of total acreages for all marine areas in Rhode Island and their NSSP classification as of May 2004 is listed in Table 3H-4. Maps and descriptions of the Shellfish Closure Areas can be found on DEM's website at www.state.ri.us/dem/programs/benviron/water/shellfish/clos/index.htm. It is important to note that some of the closed shellfish areas described in Table 3H-6 and shown on the Shellfish Closure Area maps include waters classified as SB or SB1. While Class SB and SB1 waters are not designated for shellfishing use, incorporating them into the description of shellfish closure areas allows for siting of enforceable shellfish closure lines and for ease of informing the public via maps, of closed areas whether the closure is due to pollution or a designated classification.

TABLE 3H-2
CHANGES IN STATUS OF SHELLFISH GROWING AREAS
2002-2004

Area	Reason for Change	Change	Year	Acres Affected
Greenwich Bay	Bacteria monitoring results exceed shellfish standard	Conditionally approved to Prohibited	2002	(-)201.8
Buttonwoods Cove	Bacteria monitoring results exceed shellfish standard	Approved to Prohibited	2002	(-)61.3
Point Judith Pond	Improvement in Water Quality	Prohibited to Approved	2002	(+)19.22
Point Judith Pond	Bacteria monitoring results exceed shellfish standard	Approved to Prohibited	2002	(-)13.04
Greenwich Bay	Bacteria monitoring results exceed shellfish standard	Conditionally approved to Prohibited	2003	(-)235
Greenwich Bay	Improvement in Water Quality	Prohibited to Conditionally approved	2004	(+)240
Greenwich Cove	Bacteria monitoring results exceed shellfish standard	Conditionally approved to Prohibited	2004	(-)2.0
Portsmouth/Melville	Reconfiguration consistent with Water Quality Standards	Prohibited to Approved	2004	(+)48

CHANGES IN STATUS OF SHELLFISH GROWING AREAS

	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>
Total Acres Improved:	22	2543	2267	239	566	9	18	43	19	19	0	48
Newly Restricted:	107	444	6929	567	124	524	0	0	80	276	235	2

Table 3H-3
Closure-Rates* for Conditionally Managed Areas, 1993-2003

Year	1993		1994		1995				1996				1997				1998			
Growing Area	AREA		AREA		AREA				AREA				AREA				AREA			
	A	B	A	B	A	B	Greenwich Bay	Mt. Hope/Kick*	A	B	Greenwich Bay	Mt. Hope/Kick*	A	B	Greenwich Bay*	Mt. Hope/Kick.*	A	B	Greenwich Bay*	Mt. Hope/Kick*
# Days Closed/Year	232	88	202	98	205	76	205	256	252	107	184	197	219	76	177	184	244	123	201	210
% of Year Closed	64%	24%	55%	27%	56%	21%	56%	70%	69%	29%	50%	54%	60%	21%	49%	50%	67%	34%	55%	58%

Year	1999				2000				2001				2002				2003			
Growing Area	AREA				AREA				AREA				AREA							
	A	B	Greenwich Bay*	Mt. Hope/Kick*	A	B	Greenwich Bay	Mt. Hope/Kick	A	B	Greenwich Bay	Mt. Hope/Kick	A	B	Greenwich Bay	Mt. Hope/Kick*	A	B	Greenwich Bay	Mt. Hope/Kick*
# Days Closed/Year	224	99	166	192	229	124	164	169	200	88	152	156	224	111	185	197	231	117	174	184
% of Year Closed	61%	27%	46%	53%	63%	34%	45%	46%	55%	24%	42%	43%	61%	30%	51%	54%	63%	32%	47.7	50%

June 1, 1990 - The Conditional Area was Divided into Areas A and B and Operated as Follows:

Area A - One-Half Inch (½") Rainfall or 0.5 mg By-Pass = Seven (7) Day Closure

Area A & B - One Inch (1") Rainfall = Seven (7) Day Closure

Areas A & B - Greater than 3" (>3") Rainfall = 10 Day Closure

Greenwich Bay/Mt. Hope Bay/Kickamuit River - One-Half Inch (½") Rainfall = Seven (7) Day Closure

* = These values represent closures based on predictable pollution impacts and management policies.

TABLE 3H-4

Present Shellfishing Status of Rhode Island Marine Waters

May 2004 - May2005

(numbers in parentheses refer to the shellfish closure identification number as noted on the May 2004 Shellfish Closure Area maps)

Area	STATUS (ACRES)			
	Approved	Conditionally Approved	Conditionally Approved/ Seasonal	Prohibited
Great Salt Pond, Block Island	200		439.67 (#36)	
Old Harbor, Block Island				1407.43 (#12)
Block Island Coastal Waters	61417			
Winnapaug Pond, Westerly	476			
Quonochontaug Pond, Westerly/Charlestown	747			
Ninigret Pond, Charlestown	1547.5			101.2 (#32)
Green Hill Pond, So. Kingstown				420.4 (#32)
Truston Pond, So. Kingstown	181			
Pt. Judith Pond, South Kingstown/Narragansett	1190.4			381.65 (#15, 15A, 16, 17, 18, 19)
Potter Pond, So. Kingstown	321			
Scarborough, Narragansett				1599.04 (#23)
Tuckers Dock, Narragansett				678.73 (#22)
Pettaquamscutt River, So. Kingstown/Narragansett/ No. Kingstown				617.89 (#31)
RI Sound & Mouth of Narragansett Bay	131274			
Little Narragansett Bay and Tidal Pawcatuck River				923.94 (#14)
U.R.I. Bay Campus & EPA Lab, Narragansett				19.73 (#26)
Wickford Harbor, North Kingstown			214.41 (#41)	229.97 (#27)
Bissel Cove, No. Kingstown				74.31 (#30)
Quonset Point, North Kingstown				1320.45 (#28)
Davisville, No. Kingstown				66.07 (#29)

Table 3H-4 continued

Area	STATUS (ACRES)			
	Approved	Conditionally Approved	Conditionally Approved/ Seasonal	Prohibited
Allen Harbor, No. & Little Allen's Harbor, North Kingstown				82.25 (#1)
Fry's Pond				8.49 (#33)
Greenwich Bay		1947.37 (#46)		
Greenwich Cove, East Greenwich				285.39 (#8)
Apponaug Cove and Baker Creek, Warwick				515.7 (#2)
Brush Neck Cove, Warwick				127.91 (#7)
Old Warwick Cove, Warwick				150.06 (#13)
Potowomut River, North Kingstown/East Greenwich	203.6			
Upper Narragansett Bay		9677.66 (#44 & 45)		
Providence River				6084.23 (#21)
Warren, Barrington & Palmer Rivers				1377.24 (#25)
Potter Cove, Prudence Island			105.27 (#39)	
Bristol Harbor, Bristol			94.47 (#37)	666.80 (#3)
Melville, Portsmouth				347.33 (#6)
Carr Point, South				65.68 (35)
Gould Island, East Passage				16.92 (#5)
Newport Harbor and Coddington Cove				4827.52 (#4)
Castle Hill				3.73 (#34)
East Ferry, Jamestown				809.45 (#9)
West Ferry, Jamestown			234.49 (#38)	

Table 3H-4 continued

Area	STATUS (ACRES)			
	Approved	Conditionally Approved	Conditionally Approved/ Seasonal	Prohibited
East Passage	14344.5			
West Passage	23583			
Sakonnet River	12,562			
Sakonnet Harbor			25.13 (#40)	
Nannaquaket Pond, Tiverton	200.58			4.13 (#20)
Nannaquaket Pond Channel, Tiverton				10.17 (#20)
The Cove, Portsmouth	183.17			114.02 (#11)
Kickamuit River, Bristol/Warren		464.71 (#47)	86.54 (#42 & 43)	
Mt. Hope Bay, including Island Park, Portsmouth		1804.63 (#47)		4891.03 (#10)
Total Acres	248430.75	13894.37	1199.98	28228.86
Percent of Total Acres	85.1%	4.8%	0.4%	9.7%

iii. Shoreline Surveys

As part of the NSSP requirements, the files for each shellfish growing area must be updated annually to maintain a shellfishable classification. This includes performing statistical analyses on at least the most recent 30 bacterial water sample results for each sampling station within an approved growing area and at least the most recent 15 bacterial water sample results for conditionally approved growing areas. The geometric mean and variability of the fecal coliform levels for each station are compared with the NSSP shellfish growing area criteria, and revisions to shellfish classification are made where necessary. Six bacterial sampling runs per year are taken in all approved areas, and 12 sampling runs per year are completed for certain conditionally approved areas (Upper Narragansett Bay, Block Island, Greenwich Bay, Mt. Hope Bay and the Kickamuit River).

Shoreline surveys are an additional requirement of the National Shellfish Sanitation Program (NSSP). These surveys are necessary to determine shellfish classification in a particular growing area and to locate all actual and potential bacterial sources. A sanitary survey must be made of each growing area prior to approval of the area as a source of direct consumption of shellfish or a relaying operation. The sanitary surveys are updated annually and triennially (every three (3) years). Once every 12 years the sanitary shoreline survey must be completely redone. The annual survey requires a written update and field review of any changes in actual pollution sources that have the potential to impact a growing area and a review of the analytical results of the routine bacteriological sampling of the growing area. The triennial reevaluation survey requires a written report that addresses all pollution sources identified in the growing area. The effect of the sources on the growing is evaluated and documented. As in the annual survey the routine bacteriological sampling results are also factored in. The twelve-year sanitary shoreline survey requires a complete sanitary shoreline survey of both open and closed areas of the growing area. Such surveys involve an intense examination of the shoreline to identify all running pipes and tributaries for bacteriological quality as well as calculating flow rates, and then evaluating the impact upon specific growing areas. Inactive pipe sources and drainage ditches are also documented for future reference and evaluation. The twelve-year survey includes statistical data review, new shoreline survey information, meteorological characteristics, hydrographic evaluations including time of travel estimates known for bacterial pollution sources with the potential to impact the area and dilution estimates for all known bacterial point sources. Table 3H-5 describes the areas surveyed in 2002 and 2003.

Table 3H-5

Sanitary Shoreline Surveys Conducted in 2002-2003

Growing Area	Area Surveyed	Description	Annual	Triennial	12 Year
1	Upper Bay	The waters south of a line Between Conimicut and Nayatt Points, and north of Warwick and Poppasquash Points	2003		
3	East Middle Bay	The waters east of Prudence Island and west of the Mt. Hope Bridge	2003		
4	Sakonnet River	The waters south of the Rt. 24 bridge and north of a line between Sachuset and Sakonnet Points		2003	
5	Kickemuit River	The waters north of "The Narrows" Bristol	2003	2002	
6	East Passage	The waters south of Prudence Island between the east shore of Jamestown and the west shore of Aquidneck Island		2002	
7	West Passage	The waters south of Jamestown between the east shore of North and South Kingstown and the west shore of Jamestown to the southerly tip of Jamestown.		2002	
8	Greenwich Bay	The waters of Greenwich Bay West of Sandy and Warwick Points.	2003		
9	West Middle Bay	The waters south of Prudence Island and West of the Mt. Hope Bridge.	2003		
11QW	Quonochontaug and Winnapaug Ponds	The waters of Quonochontaug and Winnapaug Ponds	2003		2002
11NG	Ninigret and Green Hill Ponds	The waters of Ninigret and Green Hill Ponds	2003		2002
13	Block Island	The shores of Block Island and Great Salt Pond		2003	
14	Offshore	The southern shorelines of Rhode Island from Napatree Point, Westerly to the Mass State line in the vicinity of Quicksand Point.		2003	
17	Mt. Hope Bay	The waters of Mt. Hope Bay east of the Mt. Hope bridge and north of the Rt. 24 bridge.	2003		2002

d. Restrictions on Bathing Areas

The Rhode Island Department of Health (HEALTH) is responsible for the licensing and regulating of bathing beach facilities in the State of Rhode Island. With help from the United States Environmental Protection Agency (USEPA), HEALTH monitors all 123 licensed beaches throughout the state. Licensed beaches include salt and freshwater, as well as public and private facilities. HEALTH has the authority to close licensed beaches in Rhode Island, along with municipalities for town beaches. Swimming advisories are generally issued when a possible source of pollution has been identified, or fecal coliform levels have been exceeded. Advisories are also issued when a swimming-related illness has been reported in a designated area.

In 2002, there were 27 beach closures totaling 103 closure days, due to elevated levels of fecal coliform bacteria (Table 3H-6). In 2003, there were 67 closures totaling 454 closure days (Table 3H-7). This represents a 341% increase in closure days from the 2002 bathing season. The increase in beach closure days can be attributed to a 120% increase in significant rainfall. Overall rainfall increased from 5.67" in 2002 to 14.96" in 2003. Furthermore, with the addition of USEPA BEACH grants, HEALTH increased the sampling efforts especially at areas where known bacteria problems exist. More information about the HEALTH Bathing Beach Program, including the 2003 Season Report, can be found at <http://www.healthri.org/topics/bathing.htm>.

Table 3H-6

**Rhode Island Department of Health
Office of Food Protection/Bathing Beaches Program**

**Beach Closures
2002**

Facility Name	Number of Days Closed	Problems Identified/Comments
Bristol Town Beach	2	Closed due to high bacterial counts – high bird population and extremely hot.
City Park/Buttonwoods	15	Closed due to high bacterial counts – elevated rainfall and temperatures.
Conimicut Point	12	Closed due to high bacterial counts – elevated temperatures
Fort Adams	6	Closed due to high bacterial counts
Goddard Park	7	Closed due to high bacterial counts – elevated rainfall
Gorton Pond	13	Closed due to high bacterial counts – elevated rainfall
Kent County YMCA	8	Closed due to high bacterial counts – elevated rainfall and temperatures.
King Park Swim Area	15	Closed due to high bacterial counts – CSO discharge, boats discharging sewage.
Lincoln Woods	6	Closed due to high bacteria counts – elevated rainfall and temperatures
Oakland Beach	12	Closed due to high bacterial counts – elevated temperatures
Warren Town Beach	7	Closed due to high bacterial counts – elevated rainfall and high counts at drain pipes.

Table 3H-7

**Beach Closures
2003**

Facility Name	Number of Days Closed	Problems Identified/Comments
Atlantic Beach Club	5	Stream, Pump Station
Barrington Town Beach	28	Run-off, Providence CSOs
Bonnet Shores Beach	3	Stream, Wildlife
Bristol Town Beach	26	Run-off, Providence CSOs
Camp Grosvenor	6	Run-off, Wildlife
Camp Massasoit	8	Wildlife
Camp Meehan	17	Wildlife
Captain Roger Wheeler	1	Unknown
City Park	23	Run-off, Boats, Wildlife
Conimicut Point	67	Providence CSOs, Wildlife
Easton's Beach	3	Failure of sewage pump station, Wildlife
Fort Adams	3	Boats
Glocester Country Club	2	Wildlife
Goddard Park	21	Run-off, Wildlife, Boats
Gorton Pond	22	Run-off, Wildlife
Governor Nottle Park	8	Wildlife
Kent County YMCA	11	Run-off, Wildlife
King Park	26	CSOs, Wildlife, Boats
Lincoln Woods	5	Geese, Bather load
Ninigret Park	1	Wildlife
North Kingstown Town Beach	11	Run-off
Oakland Beach	66	Run-off, Wildlife, Boats
Saunderstown Yacht Club	6	Run-off
Scarborough State Beach North	4	Run-off, Unapproved wastewater disposal
Scarborough State Beach South	6	Run-off, Unapproved wastewater disposal
Third Beach	2	Stream, Wildlife, Improper manure disposal
Warren Town Beach	78	Run-off

e. Restrictions on Surface Drinking Water Supplies

The Rhode Island Department of Health (RIDOH), Office of Drinking Water Quality is delegated to administer the EPA's Safe Drinking Water Act. The Office of Drinking Water Quality monitors approximately 500 public water systems, which include surface and groundwater supplies. This Office monitors both raw waters and the distribution system.

Since RIDOH requires filtration and disinfection for all surface waters, this report assesses surface water quality from the perspective of whether or not the water source required more than reasonable treatment. According to the RIDOH/Office of Drinking Water Quality, there have been no closures of public drinking water systems during 2002 due to water quality problems in the surface water supply.

Summaries of drinking water use assessments are shown in Table 3H-8 for rivers and streams and in Table 3H-9 for lakes and reservoirs.

Fifty-two (52) rivers reviewed for this report are located within Drinking Water Supply systems. These 52 rivers represents 113 river miles. Almost all of these rivers are considered unassessed for drinking water use. This is because the Department of Health only requires water quality data, to evaluate the source water, to be collected from the terminal reservoir of the system. The terminal reservoir is the location of the intake pumps. In general, sampling conducted elsewhere in the system has been determined by the DOH to be too limited in scope to use in conducting a drinking water use assessment.

Forty-two (42) lakes assessed are used as drinking water supply sources. This represents 7,813 acres associated with the drinking water supply systems. Of these 7,813 acres, 5,484 acres (70%) are considered assessed for drinking water use for this report. The remaining 2,329 lake acres, or 30% were considered not assessed for drinking water use support. In general these 2,329 acres represent portions of the drinking water supply system that are upstream of the terminal reservoir. The terminal reservoir is the location within the drinking water supply system where the Department of Health requires the water samples to be collected. Some of these upstream waters are not monitored or have only limited monitoring and are, therefore, considered unassessed for this report. Ninety-nine percent (5,424 acres) of the drinking water supply lake acres assessed were found to be fully supporting, and less than 1% (<5 acres) of the lake acres assessed fully support drinking water uses but are threatened. Approximately 1% (55 acres) of drinking water supply lake acres assessed are considered impaired for the drinking water use.

Table 3H-8 Summary of Drinking Water Use Assessments for Rivers and Streams

Total Miles Designated for Drinking Water Use <u>113.12</u>				
Total Miles Assessed for Drinking Water Use <u>4.04</u>				
Miles Fully Supporting Drinking Water Use	4.04	% Fully Supporting Drinking Water Use	100%	Contaminants
Miles Fully supporting but Threatened for Drinking Water Use		% Fully Supporting but Threatened for Drinking Water Use		
Miles Partially Supporting Drinking Water Use		% Partially Supporting Drinking Water Use		
Miles Not Supporting Drinking Water Use		% Not Supporting Drinking Water Use		

Table 3H-9 Summary of Drinking Water Use Assessments for Lakes and Reservoirs

Total Waterbody Area Designated for Drinking Water Use <u>7,813.47</u>				
Total Waterbody Area Assessed for Drinking Water Use <u>5484</u>				
Acres Fully Supporting Drinking Water Use	5424.46	% Fully Supporting Drinking Water Use	98.9%	Contaminants
Acres Fully supporting but Threatened for Drinking Water Use	4.54	% Fully supporting but Threatened for Drinking Water Use	0.1%	Natural dark (tannic) color
Acres Partially Supporting Drinking Water Use	54.97	% Partially Supporting Drinking Water Use	1%	Nutrients, excess algal growth, taste and odor, turbidity
Miles Not Supporting Drinking Water Use	0	% Not Supporting Drinking Water Use	0	